

PATENT SPECIFICATION

602,431



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COMPLETE SPECIFICATION

Improvements in or relating to Abrasive Disc Devices and Assemblies

We, TITAN ABRASIVE COMPANY, a corporation organised under the laws of the State of Illinois, United States of America, of 1416, West 59th Street, City of Chicago, State of Illinois, United States of America, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to abrasive disk assemblies and more particularly to an assembly whereby such a disk may be easily and quickly attached to and detached from its backing.

In accordance with the present invention the improved abrasive disk device comprises a backing plate means, an abrasive means, slots in one of said means, and means on the other of said means adapted to be received in said slots, the construction and arrangement being such that said disk means may be attached to said backing plate means by relative rotation thereof.

In a further form of the present invention the improved abrasive disk assembly comprises an abrasive disk means having a number of fastening devices on one face thereof, a backing plate means, and means for tightening said fastening devices in one operation whereby to clamp the disk means to the backing means.

In a further form of the present invention the improved abrasive disk device comprises an abrasive disk means with studs protruding from its rear face, a backing plate having slots extending from one face to the other, said slots and studs being so positioned and arranged that the studs may be inserted into either face of the backing plate, and the construction and arrangement being such that the abrasive disc may be attached to the backing plate by relative rotation thereof.

Abrasive disks are usually either fixedly mounted on backings at the factory or must be attached to said backings at the place of use by a large number of nuts and bolts or other fastening devices. In the first place, the backings must be returned to the factory to have new disks mounted thereon. In the second, a great deal of time and many operations are necessary to remove and replace the disks. The present invention permits the mounting of the disk on the backing at the place of use with but two simple operations, and but one locking action is necessary to hold it there.

Another feature of the present invention is the provision of means for tightening a plurality of fastening devices with a single movement of the device to which they are attached. Another feature is means facilitating an easy start to such movement. Another feature is to provide a backing plate for an abrasive disk which may be reversibly mounted on a shaft and which therefore may be used with shafts rotating in opposite directions.

Other features and advantages of the invention will appear more fully as we proceed with the specification.

In the form of device embodying the features of our invention shown in the accompanying drawings,

Fig. 1 is a side view, partly in section, of an abrasive disk mounted on a metal backing on the driving flange or wheel collar of a machine shaft;

Fig. 2 is a view taken as indicated by the line 2—2 of Fig. 1 with a portion in cross section;

Fig. 3 is a fragmentary view taken on the line 3—3 of Fig. 1.

Fig. 4 is an enlarged cross sectional view taken on the line 4—4 of Fig. 2; and

Fig. 5 is a view taken as indicated by the line 5—5 of Fig. 4.

As shown in the drawings, 10 indicates a disk of metal or other suitable material providing a backing plate for an abrasive disk 11 which is molded of silicon of carbide, aluminum oxide or similar abrasive including emery, corundum, and the like.

The backing 10 is provided with a plurality of slots 12 enlarged at one end 13 for the reception of the heads 14 of studs 15 attached to nuts 16 molded into the disk 11. The balance of the slot is of a width sufficiently larger than the body part of the studs 15 so that the studs may fit snugly therein but without binding. Washers 17, having flaring, corrugated or scalloped flanges 18, are also molded into the back of the wheel 11, and with their openings aligned with the openings in the nuts 16. A suitable cement 19 may be used to more securely anchor the washer and nut in the abrasive disk 11.

The stem of each stud 15 is provided with a shoulder 20 above its threaded end portion and with another shoulder 21 spaced from the head 14. A split washer 22 is pinched around the stem above this shoulder 21 and pressed around the shoulder by means of spring 23. The edges of the slots 12 are cut so that they taper outwardly and slope downwardly from their mid portion to the enlarged portion 13 thereby forming inclined portions 24 which terminate at the enlarged end portion 13 of the slots.

The backing plate is also provided with holes 25 countersunk on top and bottom for the reception of bolts 26 adapted to be extended into threaded openings 27 in the driving flange or wheel collar 28 of the shaft 29 on the machine with which the device is used to attach the assembly to said shaft. Hole 30, extending from the outer circumferential edge 31 of the backing plate 10 to one of the slots 12 therein, is provided for the reception of lock screw 32 having tapered end 33.

The abrasive disk and its studs are adapted to be made and assembled at the factory. Each stud 15 is provided with its head 14, spring 23, and split washer 22, and is then threaded into the nut 16 until the shoulder 20 contacts the washer 17 which limits its further movement. When received by the user the disk can be quickly mounted on the metal backing plate by inserting the studs 15 through the enlarged portions of the slots. When this is done, the shoulders 21 of the studs and the split washers 22 are slightly above the ends of the inclined portions 24 of the slots. The split washer with the spring pressing against it provides limited play (as for example three hundredths of an inch in a two foot diameter assembly we have built embodying these inventions)

to take up variations in thickness of the mounting plate and the length of the studs.

The abrasive disk is then rotated to move the studs 15 in the slots 11 until the studs contact the opposite ends 34 of the slots where they are held in place by the action of the springs forcing the split washers against the rear face of the metal backing, thereby clamping the two disks together. As shown in the drawing (see Figs. 2 and 4) this movement is to the left or counter clockwise but if the plate is reversed as hereinafter explained the movement would be in the opposite direction. The lock screw 32, the end of which is thrust against the stud 15, serves as an additional locking means. Furthermore, should the studs not be driven against the end wall 34 of the slots by the action just described, the tapered end of the lock screw will force or "jack" them against such wall when it is tightened.

The inclined edges of the slots permit an easy starting movement of the abrasive disk, as the action of the spring does not take effect until the split washers 23 contact the inclined portion 24 which does not occur until the disk has acquired some momentum.

It will be noted that the edges of the slots are cut to form inclined portions on both faces of the backing plate and the center holes 26 of the backing are countersunk at both ends. This provides for reversible mounting of the abrasive disks on the backing plate so that the plate may always be driven in the same direction relative to the slots, i.e. the enlarged end of the slot will always lead regardless of the direction of movement of the driving shaft. This serves as an additional anchoring means because movement of the abrasive disk due to frictional resistance while grinding will force the studs 15 against the end wall 34 of the slots and none of this force is exerted against the lock screw.

From the above, it is apparent that the abrasive disk may be easily and quickly placed on the backing plate and forced into the desired working position thereon whereby a plurality of studs are locked into position with one movement and secured in such position with the locking action. The disk may be just as quickly replaced without removing the backing from the machine. Thus, many men and machine hours are saved in mounting the disks on the backing plate and but one backing plate is necessary for each size of disk.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to

be performed, we declare that what we claim is:—

1. An abrasive disk device comprising a backing plate means, an abrasive disk means, slots in one of said means, and means on the other of said means adapted to be received in said slots, the construction and arrangement being such that said disk means may be attached to said backing plate means by relative rotation thereof.
2. An abrasive disk assembly comprising an abrasive disk means having a number of fastening devices on one face thereof, a backing plate means, and means for tightening said fastening devices in one operation whereby to clamp the disk means to the backing means.
3. An abrasive disk assembly according to Claim 1, or 2, having slot means in said plate means to receive said devices, said disk means and plate means being so constructed and arranged that rotary movement of either will cause said devices to be tightened whereby to clamp the disk means to the plate means.
4. An abrasive disk assembly according to Claim 1, 2, or 3, wherein said devices are so constructed and arranged that rotary movement of the disk means relative to the plate means will tighten the devices to clamp the disk means to the plate means, and means permitting an easy start for such rotary movement.
5. An abrasive disk assembly according to Claim 1, 2, or 3, comprising a backing plate provided with a number of slots, an abrasive disk having means protruding from its rear face and adapted to extend through said slots, the construction and arrangement providing for automatically locking said means in said slots upon rotation of the disk relative to the backing plate.
6. An abrasive disk assembly according to any of the preceding claims, comprising a backing plate provided with a number of slots, an abrasive disk having studs with enlarged heads extending from the rear face thereof, said slots having enlarged ends for receiving said studs, the opposite ends of said slots being of a size to snugly receive said studs, and means on said studs to clamp them to the backing plate.
7. An abrasive disk assembly according to claim 6, in which the edges of the slots taper toward the enlarged portion.
8. An abrasive disk assembly according to claim 6, in which the slots extend from one face to the other of the backing member and the edges of the slots are tapered toward the enlarged portions on both faces of the backing member.

9. An abrasive disk assembly according to claim 6, in which the clamping means is a washer and spring around the studs and adjacent the heads thereof.

10. An abrasive disk assembly according to any of the preceding claims comprising a backing plate provided with a number of slots each having an enlarged end portion, the edge of said slots tapering toward said enlarged end, an abrasive disk having studs with enlarged heads each having a shoulder spaced from said head and lying above the end of said tapered edges of the slots when the studs are inserted into the slots, a washer on each shoulder, and a spring around each stud between the head and washer to force the washer against the shoulder.

11. An abrasive disk device comprising an abrasive disk means with studs protruding from its rear face, a backing plate having slots extending from one face to the other, said slots and studs being so positioned and arranged that the studs may be inserted into either face of the backing plate, and the construction and arrangement being such that the abrasive disk may be attached to the backing plate by relative rotation thereof.

12. An abrasive disk assembly adapted to be attached to a drive shaft comprising a slotted backing member, an abrasive disk member having studs protruding therefrom and adapted to be clamped in said slots, and means for reversibly attaching said backing member to the shaft, the construction and arrangement being such that the abrasive disk may be attached to the backing plate by relative rotation thereof.

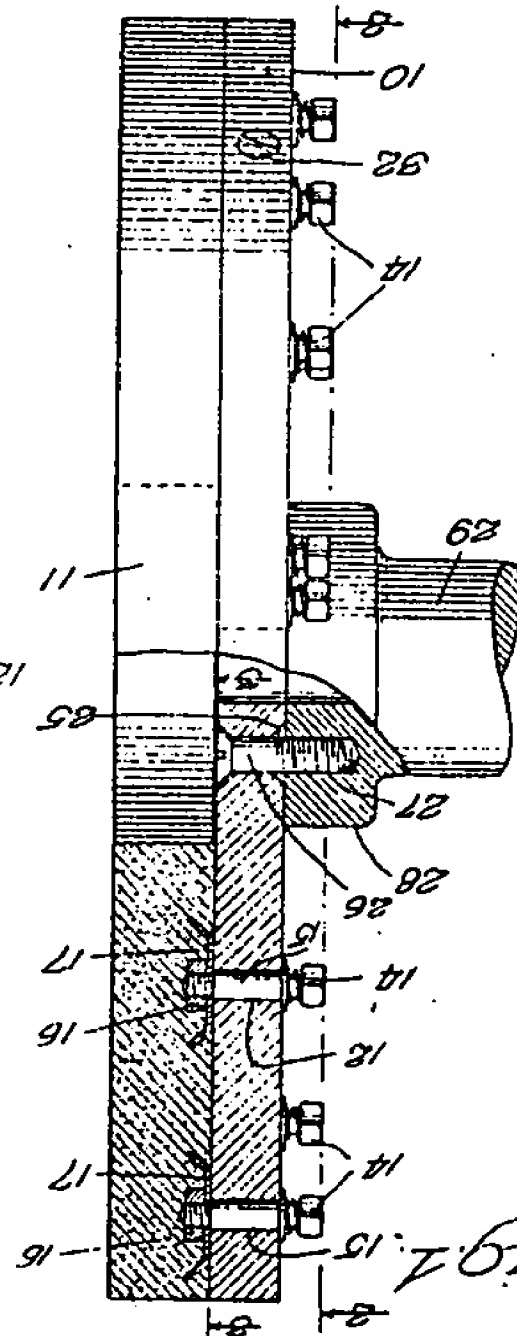
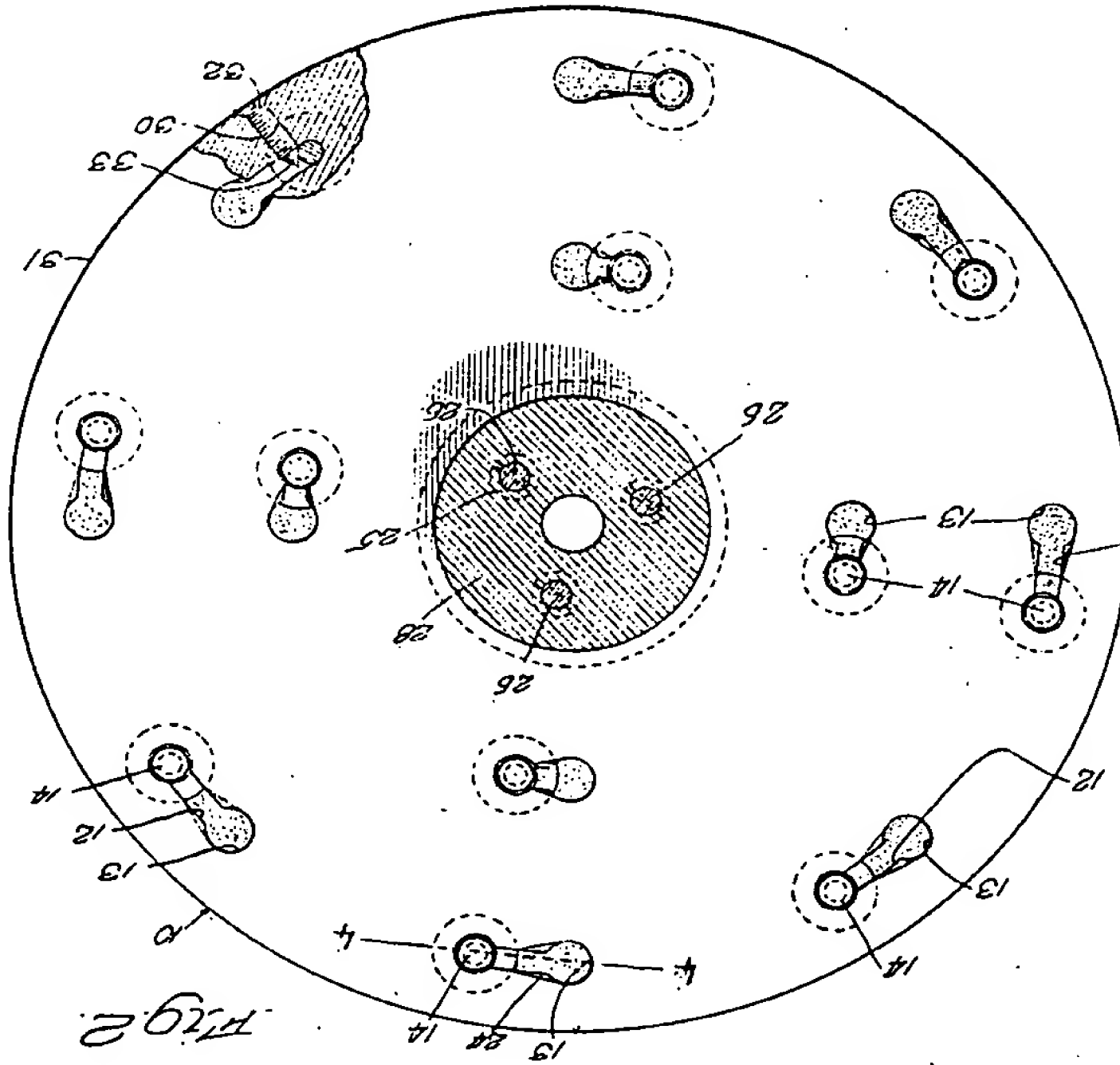
13. An abrasive disk assembly according to any of the preceding claims, having means for locking said disk to said plate.

14. An abrasive disk assembly according to claim 13, in which the locking means is a nut having a tapered end adapted, when the nut is tightened, to engage one of said studs and force it against the smaller end of its slot.

15. An abrasive disk assembly constructed substantially as herein described with reference to Figures 1 to 5, inclusive, of the accompanying drawings.

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[This Drawing is a reproduction of the Original on a reduced scale]

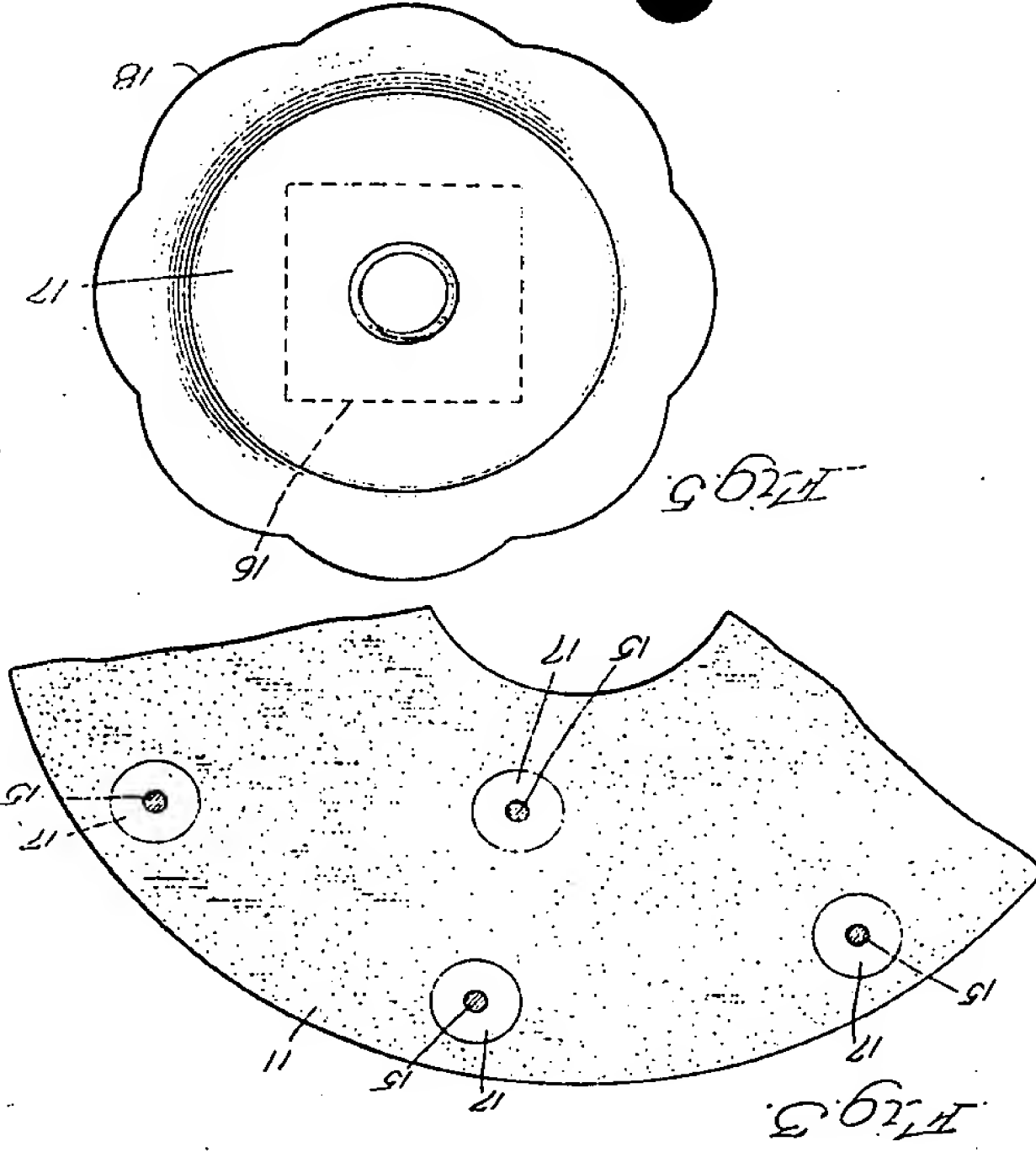
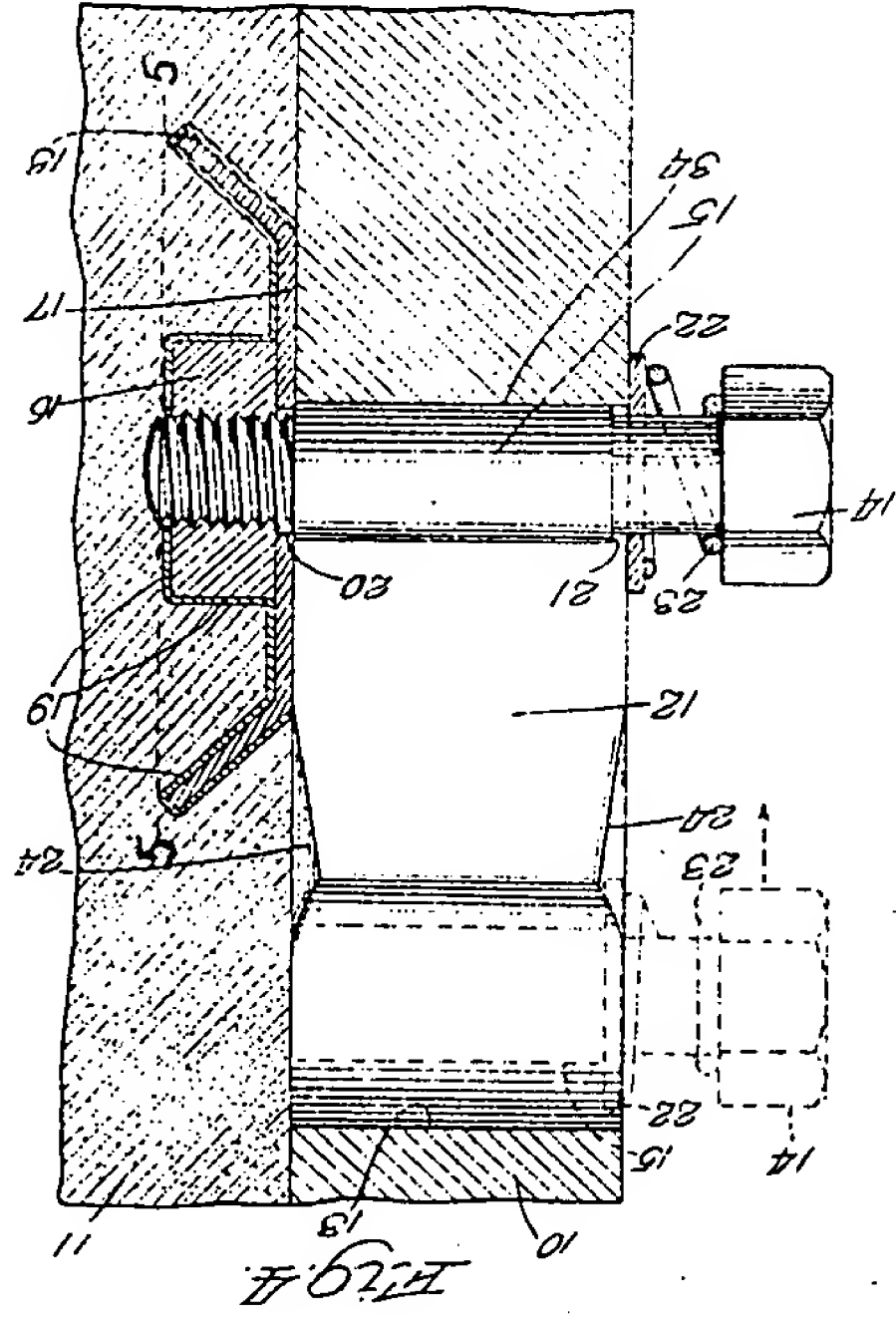


Fig. 5